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June 18, 1980

Director, Office of Nuclear Reactor Regulation
Attention: D. M. Crutchfield, Chief
Operating Projects Branch No. 5
U. S. Nuclear Regulatory Commission
Washington, D.C. 20555

Gentlemen:

Subject: Docket No. 50-206
Environmental Qualification of Electrical Equipment
San Onofre Nuclear Generating Station
Unit 1

Mr. D. L. Ziemann's letters of March 6 and March 28, 1980 requested information regarding the environmental qualification of safety related electrical equipment at San Onofre Unit 1. This information is provided as an enclosure to this letter. In addition, emergency operation instructions and information regarding the containment pressure and temperature analysis for San Onofre Unit 1 were provided by our letters dated March 14 and May 1, 1980.

It should be noted that SCE's review of this matter is continuing. As information is identified which was not available for inclusion in this submittal, appropriate revisions to the enclosed information will be provided to the NRC Staff.

If you have any questions on this information, please let me know.

Subscribed on this 18th day of June 1980.

By K P Baskin
K. P. Baskin
Manager, Nuclear Engineering and
Licensing

OFFICIAL SEAL
AGNES CRABTREE
NOTARY PUBLIC - CALIFORNIA
PRINCIPAL OFFICE IN
LOS ANGELES COUNTY
My Commission Exp. Aug. 27, 1982

Subscribed and sworn to before me on this
18th day of June 1980.

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Agnes Crabtree
Notary Public in and for the County of
Los Angeles, State of California

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P Enclosure

Enclosure

ENVIRONMENTAL QUALIFICATION OF ELECTRICAL EQUIPMENT SAN ONOFRE UNIT 1

In connection with the NRC's continuing review of the environmental qualification of electrical equipment at San Onofre Unit 1, additional information was requested by Mr. D. L. Ziemann's letters of February 15, 1980, March 6, 1980 and March 28, 1980. In particular, the February 15, 1980 letter included additional guidance in Enclosure 1, " Guidelines for Evaluating Environmental Qualification of Class IE Electrical Equipment in Operating Reactors," and Enclosure 2, "Guidelines for Identification of That Safety Equipment of SEP Operating Reactors for Which Environmental Qualification is to be Addressed." The qualification of electrical equipment at San Onofre Unit 1 with respect to these guidelines is discussed in the following paragraphs. The format for this information is consistent with guidance provided by the NRC Staff at a meeting on February 21, 1980. This information augments the information on this subject which has previously been submitted by letters dated February 24, 1978 and February 13, 1979.

Safety Related Electrical Equipment

In accordance with Enclosure 2 to Mr. D. L. Ziemann's February 15, 1980 letter, the Final Safety Analysis Report, the Emergency Operating Procedure for a Loss of Coolant (S-3-5.5, Rev. 18) and other relevant correspondence were reviewed to identify the safety related electrical equipment which is utilized to mitigate the consequences of a loss of primary or secondary coolant (LOCA, MSLB or FWLB) at San Onofre Unit 1. A comprehensive list of equipment from these sources is provided by system in Table 1.

The list of equipment in Table 1 has been further reviewed to determine whether each specific component is required to mitigate the consequences of a loss of primary or secondary coolant. The systems or components which have been determined to be not required to mitigate the consequences of a loss of primary or secondary coolant are listed in Table 2. In each case, the basis for excluding the particular system or component is provided. Qualification of equipment listed in Table 2 is not further addressed.

Environment Following Loss of Coolant

For the purposes of defining the environment following a postulated loss of primary or secondary coolant, the plant has been divided into various areas as identified in Figure 1. The limiting environment associated with each of these areas following a loss of coolant is identified in Table 3. The basis for the indicated environment is also identified.

Environmental Qualification of Safety Related Electrical Equipment

Areas of the plant where there is no difference between the environment during normal operation and the environment following a loss of primary or secondary coolant are defined as nonhostile environments. Equipment which is located in

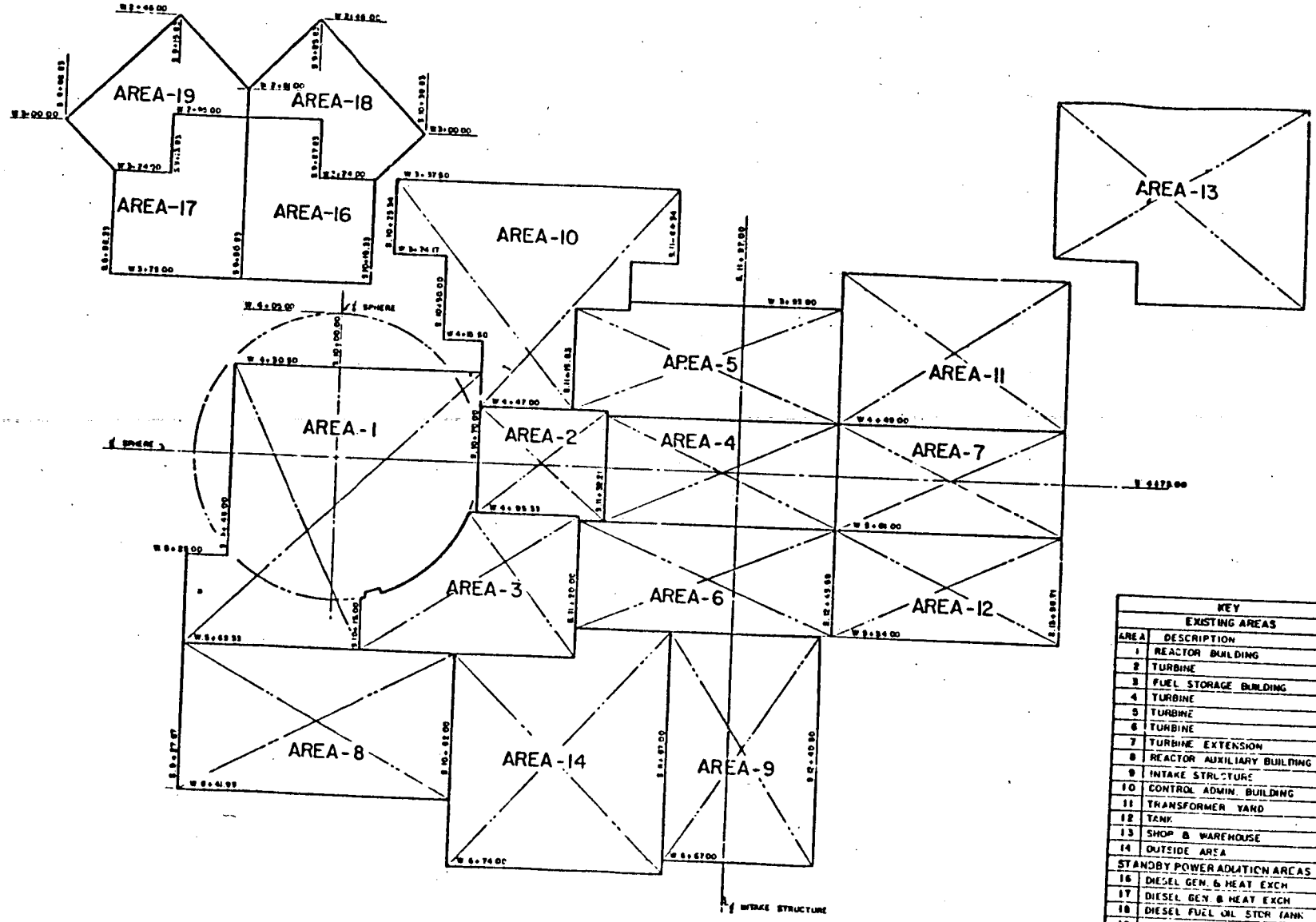
a nonhostile environment, as defined in Table 3, is concluded to be qualified by experience based on the fact that this equipment is functional during normal operation of the plant. The equipment which is located in a nonhostile environment is listed by system in Table 4. Qualification of equipment in Table 4 is not further addressed.

Equipment which is required to function to mitigate the consequences of a loss of primary or secondary coolant and which is located in a hostile environment is listed by system in Table 5. In addition, the hostile environment, the qualification of each component and the basis for that qualification is listed in Table 5. It shall be noted that although the NRC Guidelines contemplate that equipment inside containment will be qualified by type testing, where such testing is not available for original plant equipment, qualification has been based on analysis and/or similarity.

Equipment for which qualification is not available to fully satisfy the hostile environment conditions identified in Table 5 is listed in Table 6. For each component listed in Table 6, additional information and/or proposed remedies are provided. For example, the existence of redundant systems, or the time period in which the equipment is required to operate can provide sufficient basis for not requiring additional qualification of a particular component. Evaluation of the environmental qualification of all components listed in Table 6 is continuing.

The NRC guidelines suggest that equipment required to mitigate the consequences of a loss of primary or secondary coolant should be reviewed with respect to the potential for degradation due to thermal and radiation aging. Although such a review is not included in the environmental qualification evaluations in this submittal, the following actions will be initiated to ensure that equipment is not susceptible to significant degradation due to thermal and radiation aging: (1) Maintenance procedure(s) will be prepared to ensure that aging characteristics of component materials are considered in selection of replacement parts, and (2) a program will be initiated to periodically review maintenance and surveillance records to identify the need for replacement or modification of equipment or components which are exhibiting age related degradation.

Based on the information presented in the preceding paragraphs and the attached tables, there is sufficient basis to conclude that San Onofre Unit 1 can be brought to a safe shutdown condition following a postulated loss of primary of secondary coolant without undue risk to the health and safety of the public.



KEY	
EXISTING AREAS	
AREA	DESCRIPTION
1	REACTOR BUILDING
2	TURBINE
3	FUEL STORAGE BUILDING
4	TURBINE
5	TURBINE
6	TURBINE
7	TURBINE EXTENSION
8	REACTOR AUXILIARY BUILDING
9	INTAKE STRUCTURE
10	CONTROL ADMIN. BUILDING
11	TRANSFORMER YARD
12	TANK
13	SHOP & WAREHOUSE
14	OUTSIDE AREA
STANDBY POWER ADDITION AREAS	
16	DIESEL GEN. & HEAT EXCH
17	DIESEL GEN. & HEAT EXCH
18	DIESEL FUEL OIL STOR TANK
19	DIESEL FUEL OIL STOR TANK

FIGURE 1
SONGS 1 AREA
INDEX PLAN

TABLE 1: Systems and components associated with Operating Instruction S-3-5.5, Rev. 18, Loss of Coolant:

1. Reactor Protection System (RPS)

   Reactor Trip Circuit Breakers
   Instrumentation and equipment required to trip the reactor on:
   a. Steam flow/feedwater flow mismatch
      FT-460, FT-461 and FT-462
      FT-456, FT-457 and FT-458
      FM-456B-X, FM-457B-X and FM-458B-X
   b. Pressurizer high/low pressure
      PT-430, PT-431 and PT-432
      YE-430B, YE-431B, YE-432B
      PC-430A/F, PC-431A/D, PC-432A/B
      PI-430, PI-431, PI-432
   c. Safety Injection Sequencer
   d. Pressurizer high level
      LT-430, LT-431 and LT-432
      YE-430A, YE-431A, YE-432A
      LC-430A, LC-431A, LC-432A
      LI-430, LI-431, LI-432
   e. Reactor overpower
      K-1501 to K-1508

2. Safety Injection System (SIS)

   Safety Injection Pumps G-50A and G-50B
   PT-910A (east) and PT-910B (west)
   Feedwater Pumps G-3A and G-3B
   HV-853A and HV-853B
   HV-854A and HV-854B
   HV-852A and HV-852B
   HV-851A and HV-851B
   CV-875A and CV-875B
   CV-36 and CV-37
   FT-912/FI-912, FT-913/FI-913, FT-914/FI-914
   MOV-850A, MOV-850B and MOV-850C
   Refueling water tank level LT-950, LI-950
   LS-69

3. Containment Isolation System (CIS)

   CV-102 and 103 (Sphere Sump Discharge)
   CV-104 and 105 (RCS Drain Tank Discharge)
   CV-106 and 107 (RCS Drain Tank Vent)
   CV-146 and 147 (Sphere Air Sample)
   SV-1212-8 and 1212-9 (Sphere Air Sample)
   CV-117, 118 and 119 (Steam Generator Steam Sample)
   CV-120, 121 and 122 (Steam Generator Blowdown Sample)
   CV-123 (Service Air)
   CV-949, 957 and 962 (RCS Sampling)
   CV-537 and 115 (Service Water)
   CV-533 and 534 (Pressurizer Relief Tank)

CV-536 and 535 (RCS Drain Tank)
CV-525 and 526 (RCS Letdown)
CV-527 and 528 (RCP Sealwater)
CV-287 (RCS Letdown)
CV-202, 203 and 204 (RCS Letdown)
CV-532 (Pressurizer Relief Tank)
CV-515 and 516 (Air Units Cooling Water)
PT-1120 A, B, C and PT-1121 A, B, and C
CS-1, 2 and 3
Limit Switches
SV-702 B, D (Cold Leg Vent)
SV-702 A, C (Cold Leg Vent)
POV-9, 10 (Sphere Purge)
CV-40, 116 (Sphere Vent)
CV-10, (Sphere Vent)

4. Residual Heat Removal System (RHR)

5. Chemical and Volume Control System (CVCS)

Note: Portions of the system are also listed as components of the Recirculation System

FCV-1115A, FCV-1115B, FCV-1115C
CV-410 and CV-411
LT-1100/LI-1100A (Volume Control Tank)
LT-1108/LR-1108

6. Containment Spray System (CSS)

Note: Portions of this system are also listed as components of the Safety Injection System

Refueling water pumps G-27A and G-27B
CV-517 and CV-518
PT-18, PI-165 (refueling water pump discharge pressure)
FT-504, FQ-504, FY-504, FIS-522 (spray flow)
PT-501, PT-502 and PT-503
PIS-511, 512 and 513
CV-82 and CV-114
MOV-880
MOV-883
Chemical addition pumps, G-200A and G-200B
SV-600 and SV-601
FT-506 and FT-507 (hydrazine flow)
FIS-500 and FIS-501
LT-500A and LT-500B (hydrazine tank level)
LIS-500A and LIS-500B

7. Atmospheric Steam Dump Valves (ADV)

   CV-76, CV-77, CV-78 and CV-79

8. Component Cooling Water System (CCWS)

   CCW pumps G-15A, G-15B and G-15C
   MOV-720A, B
   TE/TC/TR-606
   FT/FI-606
   CV-737A and CV-737B (Recirculation heat exchanger)

9. Salt Water Cooling System (SWCS)

   Salt Water Cooling pumps G-13A and G-13B
   POV-5 and POV-6, SV-24 and SV-25
   MOV-9
   SV-81, SV-82

10. Monitoring Instrumentation

    TA-401B-X, TA-411B-X and TA-421B-X (RCS low T ave.)
    CBX-1-1, CBX-1-2, CBX-2-1, CBX-2-2, SDX-1-1 and SDX-2-1
    K1521, K1522, K1523 and K1524
    Steam pressure PT-2/R8-2
    Core exit thermocouples
    PT-4/R8-1
    RCS subcooling recorder
    Pressure Transmitter for RCS subcooling recorder
    Reactor Coolant Temperature Detectors
    YR-456, YR-457, YR-458 (steam generator low level)
    Humidistat

11. Auxiliary Feedwater System (AFWS)

    Auxiliary Feedwater Pump G-10
    FT/FC/FI-2002A, B, C (auxiliary feedwater flow)
    LT/LI-450X, 451X, 452X
    Condensate Storage Tank Level

12. Electrical Distribution System (EDS)

    4 kV buses 1C and 2C
    480 V buses 1, 2 and 3
    Motor Control Centers 1, 1A, 1B, 2, 2A, 2B, 3
    Vital Buses 1, 2, 3, 4 and Utility Bus
    DC Buses 1, 2
    Battery Chargers A, B, C, D
    Undervoltage Relays CV6, CV7
    MOV-850C UPS
    Diesel Generators and supporting systems
    Penetrations

Cable
Cable Splices

13. Control Room Air Conditioning System (CRACS)

Fan A-33
Motors for A-31 normal filter and emergency filter dampers

14. Radiation Monitoring System (RMS)

R-1215 (air ejector)
R-1214 (stack)
R-1216 (steam generator blowdown)
R-1232 (containment area radiation monitor)
R-1234 (auxiliary building area radiation monitor)
RLR-1200, 1201

15. Instrument Air System

Instrument and Service Air Compressors K-1A, K-1B and K-1C
Emergency Air Compressor
PCV-40
SV-105, SV-106 and SV-107
CV-41
PS-56, PS-57 and PS-58
SV-147
PS-119
PT-11, PT-12, PI-163 and PI-164 (Instrument and service air pressure)

16. Reactor Coolant System

CV-530 and CV-531
CV-545 and CV-546
Valve Position Indication
Pressurizer Heaters

17. Main Condenser System

18. Recirculation System

Note: Portions of this system are also listed as components of the Containment Spray System

Recirculation pumps G-45A and G-45B
MOV-866A and MOV-866B
FT-500, FQ-500, FY-500, FIS-520
FT-501, FQ-501, FY-501, FIS-521
LC-951, LI-951
LS-73

FCV-1115D, FCV-1115E and FCV-1115F
MOV-356, MOV-357 and MOV-358
MOV-1100B, MOV-1100D and MOV-1100C
Charging pumps G-8A and G-8B
Charging pump discharge pressure indicator PT-1119A and B
MOV-18 and MOV-19
FT-1114A/FI-1114A, FT-1114B/FI-1114B and FT-1114C/FI-1114C

19. Hot Leg Recirculation

FCV-1112
FIT-1112, FI-1112, FC-1112
CV-304
CV-305
PCV-430C and PCV-430H

TABLE 2: Equipment Not Essential to Mitigate a Loss of Primary or Secondary Coolant

Safety Injection System

PT-910A (east) and PT-910B (west)
These pressure transmitters monitor the safety injection pump discharge pressure and can be used by the operator to determine if the pumps are running. However, there are no trips or automatic actions associated with these transmitters. Operation of the safety injection pumps can be determined from other monitored parameters, such as safety injection line flowrate (FI-912, FI-913 and FI-914) and RWST level (LI-950).

Recirculation System

PT-1119A (north) and PT-1119B (south)
These pressure transmitters monitor the charging pump discharge pressure and can be used by the operator to determine if the pumps are running. There are no trips or automatic actions associated with these transmitters. Operation of the charging pumps can be determined from other monitored parameters, such as charging pump safety injection flowrate (FI-1114 A, FI-1114 B and FI-1114 C).

Residual Heat Removal System

The Residual Heat Removal (RHR) System is used to attain a cold shutdown condition. However, in the event that all or part of this system is unavailable following a steam or feedwater line break inside containment alternate shutdown methods are available. One such method involves removal of heat through the steam generators and is described in the Loss of Coolant Operating Instruction. Another method involves use of the recirculation pumps to provide cooling and is described in Item 5 of the enclosure to SCE's letter to the NRC dated November 27, 1974. In the event of a steam or feedwater line break outside containment, the RHR system would not be affected by a hostile environment and would be available to permit operations to attain cold shutdown.

Chemical and Volume Control System

LT-1100/LI-1100A
This indicator provides volume control tank level indication as one of the listed accident symptoms. However, other instrumentation is available to identify the accident as listed in Section 1.0 of the Operating Instruction. Therefore, this indication is not required. (Following a loss of coolant accident charging pump suction is from the RWST and not the volume control tank.)

LT-1108/LR-1108
This instrumentation monitors the level in the boric acid tank, which can be used following a steam or feedwater line break for boration of the RCS to cold shutdown conditions. However, boration can be accomplished for these accidents utilizing RWST water. Therefore, level instrumentation associated with the boric acid tank is not required.

FCV-1115A, B, C
These valves are the reactor coolant pump seal injection flow control valves. Following an accident these valves are kept open to maintain seal injection in accordance with the Operating Instruction. However, in the event of a LOCA, these valves are closed and the parallel recirculation flow control valves (FCV-1115 D, E and F) are opened to establish recirculation flow to the core. The operator is instructed to establish 110 gpm to each cold leg. In the event that one or all of FCV-1115A, B and C were to fail in the open position, this would not affect the ability to establish a flow of 110 gpm since these valves are small compared to the recirculation flow control valves.

Containment Spray System

PT-18, PI-165
This pressure transmitter and indicator provide indication of refueling water pump discharge pressure and can be used by the operator to determine if the pumps are running. There are no trips or automatic actions associated with these instruments. Operation of these pumps can be determined from other monitored parameters such as containment spray flowrate (FIS-522).

FT-506, FT-507, LT-500A, LT-500B
FIS-500, FIS-501, LIS-500A, LIS-500B
These instruments provide indication of hydrazine flow and hydrazine tank level. However, this is a completely automatic and redundant system and failure of both trains is not considered credible. These instruments are not required for proper operation of the system. Therefore, these instruments are not required.

Main Condenser System

If the main condenser is available following an accident, it can be used for dumping steam. However, this system would be unavailable in the event of a loss of offsite power. The atmospheric dump valves or steam generator safety valves can be used to dump steam as required.

Monitoring Instrumentation

CBX-1-1, CBX-1-2, CBX-2-1, CBX-2-2, SDX-1-1, SDX-2-1, K1521, K1522, K1523, K1524
This instrumentation is used to verify reactor trip. However, redundant means exist for automatically initiating a reactor trip and failure of such redundant means, including manual trip, is not considered credible. Therefore, these instruments are not required.

PT-4/R8-1
This instrumentation records feedwater pump discharge pressure and can be used to determine a feedwater line break. However, other instrumentation is available to adequately diagnose a feedwater line break including steam generator level and feedwater flow.

Core Exit Thermocouples
These instruments are used to verify adequate core cooling. However, other instrumentation is available to determine this, including hot leg temperature.

Humidistat
This instrument is used to monitor containment humidity and provides an alarm on high humidity which is one of the listed symptoms for a loss of coolant. However, other instrumentation is available to identify the accident as listed in Section 1.0 of the Operating Instruction. Therefore, this indication is not required.

YR-456, YR-457, YR-458
These instruments provide an alarm on low steam generator level which is one of the listed symptoms for a steam line break. However, other instrumentation is available to identify the accident as listed in Section 1.0 of the Operating Instruction. Therefore, this indication is not required. In addition, indication of steam generator level is provided by LI-450X, 451X and 452X.

TA-401B-X, 411B-X, 421B-X
These instruments provide an indication of RCS average temperature which is identified as one of the symptoms of a loss of coolant. This information is not required during the course of the accident since the RCTD's provide information regarding the status of the RCS. In addition, other instrumentation is available to identify the accident as listed in Section 1.0 of the Operating Instruction.

Radiation Monitoring System

R-1214
This instrument monitors radiation in the stack and is one of the listed symptoms for a steam generator tube rupture. However, other instrumentation is available to identify the accident as listed in Section 1.0 of the Operating Instruction.

R-1234
This instrument monitors the radiation levels in the reactor auxiliary building. The Operating Instruction instructs the operator to monitor this for detection of recirculation loop leakage. However, the instruction also indicates that recirculation flow must be maintained and so this information cannot be used to change the status of the recirculation system. Therefore, this monitor is not required.

Electrical Distribution System

L&F Machine Penetrations
These penetrations are used for the power circuitry associated with the reactor coolant pumps. Following a LOCA or MSLB inside containment, the reactor coolant pumps are not required.

Containment Isolation System

Limit Switches
The limit switches on the containment isolation valves are only associated with providing valve position indication in the control room. These switches are not associated with valve movement and as such their failure will not affect closure of the isolation valves.

Reactor Protection System

K-1501 to K-1508
These instruments provide a reactor trip on overpower which is one of the listed symptoms for a main steam line break. Sufficiently redundant means exist for automatically initiating a trip such that this trip is not essential. In addition, other instrumentation is available to identify the accident as listed in Section 1.0 of the Operating Instruction. Therefore, these instruments are not required.

Reactor Coolant System

Pressurizer Heaters
The pressurizer heaters would normally be used to provide primary system pressure control during long term cooling following a small break LOCA, MSLB or MFLB. However, in the event that the pressurizer heaters are not available, alternate methods of system pressure control are available as discussed in NUREG-0611. These methods include: (1) controlling the system temperature by controlling the rate of energy removal from the primary system by the steam generator, (2) controlling the liquid level in the pressurizer to account for the cooling off of the liquid, steam, and metal, (3) water-solid operation of the pressurizer, or (4) operation of the safety injection system. Therefore, the pressurizer heaters are not required.

Table 3: Post-Accident Environmental Conditions

Area 1, Containment

The environment specified in containment is based on the guidelines in Enclosure 1 to Mr. Ziemann's February 15, 1980 letter. Specifically, the environment is based on a LOCA. Temperature and pressure are based on the Containment Post Accident Pressure Reanalysis submitted to the NRC by letter dated January 19, 1977. Chemical sprays are used as identified in Amendment 52 to the Final Safety Analysis Report forwarded by letter dated December 3, 1975. Radiation is based on the value specified in Enclosure 1 to Mr. Ziemann's February 15 letter. The post-accident flooding level is based on an elevation of 3' 11" as indicated in Appendix B of NUS-1854, Separation and LOCA Environment Assessment of San Onofre Unit 1 Emergency Core Cooling Systems, dated December, 1977.

Based on the above references the following environment is specified for the containment:

Temperature:	291°F
Pressure:	64.1 psia
Relative Humidity:	100%
Chemical Sprays:	Yes
Radiation:	2×10^7 rads
Submergence:	Yes to elevation 3' 11"

It is noted that the radiation level of 2×10^7 rads identified above is based on the NRC guidelines for gamma radiation. Beta radiation has not been evaluated in this submittal since it is considered less significant than gamma radiation due to its low penetrating power. In addition, recent analyses done in connection with TMI followup activities have calculated a value for San Onofre Unit 1 of 2×10^8 rads integrated over one year. It is our understanding that the basis for these numbers is the same, i.e., TID 14844. Pending further discussions with the NRC staff to resolve differences in these numbers, the NRC guideline number will continue to be utilized for environmental qualification.

The NRC guidelines also specify that for PWR's with automatic containment spray, the LOCA environment can be used for qualification of equipment to an MSLB environment. San Onofre Unit 1 has automatic containment spray. However, the environment associated with an MSLB at San Onofre Unit 1 is currently being reevaluated in accordance with automation of the auxiliary feedwater system. Preliminary results of these analyses have been communicated to the NRC in recent meetings and correspondence. Following completion of these analyses, the appropriate environment for qualification of equipment inside containment required to mitigate the consequences of an MSLB will be reevaluated.

Area 1, Piping Penetration Building

The Piping Penetration Building is located west of the containment. The temperature in this building is expected to increase slightly under the post-accident conditions and, as such, a value of 110°F was specified in NUS-1854 dated December, 1977. Pressure will remain at atmospheric. Radiation in this area will be due to operating the recirculation system since some components of this system are located in this area. The radiation level is based on the guidelines in Enclosure 1 to Mr. Ziemann's February 15 letter.

Based on the above, the following environment is specified for the Piping Penetration Building:

Temperature:	110°F
Pressure:	14.7 psia
Relative Humidity:	100%
Chemical Sprays:	No
Radiation:	4×10^6 rads
Submergence:	No

Area 1, Outside

In the areas outside, the environmental conditions will remain at ambient with the exception of radiation which results from operating the recirculation system. The radiation level is based on the NRC guidelines. The following environment is specified:

Temperature:	97°F
Pressure:	14.7 psia
Relative Humidity:	100%
Chemical Sprays:	No
Radiation:	4×10^6 rads
Submergence:	No

Area 2, Mezzanine Under Turbine Deck

Area 2 is located directly south of the containment and contains the feedwater and steam piping. The limiting temperature in this area is based on a high energy line break which results in a saturated steam environment at atmospheric pressure. This is based on the Report on Effects of a Piping System Break Outside the Containment dated December, 1973. The radiation level in this area is based on the TMI calculations of the integrated dose for 1 year due to a LOCA (see the discussion for Area 1, Containment). The specified environment is:

Temperature:	212°F
Pressure:	14.7 psia
Relative Humidity:	100%
Chemical Sprays:	No
Radiation:	3×10^7 rads
Submergence:	No

Area 3, Fuel Storage Building

This building will remain at ambient conditions following an accident. With respect to radiation, calculations performed for TMI followup, have estimated a value of 5×10^2 rads integrated over one year at the outside wall of the Sphere Enclosure Building. Therefore, the dose in Area 3 will be significantly less than this and is considered insignificant. The specified environment is:

Temperature:	97°F
Pressure:	14.7 psia
Relative Humidity:	100%
Chemical Sprays:	No
Radiation:	No
Submergence:	No

Areas 4, 5 and 6, Under Turbine Deck

The limiting temperature in this area is based on a high energy line break (see the discussion for Area 2). The radiation level which may result from a LOCA, is considered insignificant (see the discussion for Area 3). The specified environment is:

Temperature:	212°F
Pressure:	14.7 psia
Relative Humidity:	100%
Chemical Sprays:	No
Radiation:	No
Submergence:	No

Area 7, Turbine Deck Extension

This area is at the south end of the turbine building and will remain at ambient conditions following any postulated accident. The specified environment is:

Temperature:	97°F
Pressure:	14.7 psia
Relative Humidity:	100%
Chemical Sprays:	No
Radiation:	No
Submergence:	No

Area 8, Auxiliary Building

The auxiliary building and auxiliary building roof, located west of containment, contain various items of recirculation equipment. The post-accident environment is ambient with the exception of radiation which results from operating the recirculation system. The radiation level is based on the NRC guidelines. The specified environment is:

Temperature:	97°F
Pressure:	14.7 psia
Relative Humidity:	100%
Chemical Sprays:	No
Radiation:	4×10^6 rads
Submergence:	No

Area 9, Intake Structure

This area is outside and removed from radiation areas. Environmental conditions will remain at ambient. The specified environment is:

Temperature:	97°F
Pressure:	14.7 psia
Relative Humidity:	100%
Chemical Sprays:	No
Radiation:	No
Submergence:	No

Area 10, Control Administration Building

This area contains the control room and various electrical distribution equipment. The control room environment will remain at ambient conditions following an accident provided the control room fan is operable. Other areas do not require air conditioning to be operable. The specified environment is:

Temperature:	97°F
Pressure:	14.7 psia
Relative Humidity:	100%
Chemical Sprays:	No
Radiation:	No
Submergence:	No

Area 12, Condensate Storage Tank

This area is outside and will remain at ambient conditions. The specified environment is:

Temperature:	97°F
Pressure:	14.7 psia
Relative Humidity:	100%
Chemical Sprays:	No
Radiation:	No
Submergence:	No

Area 14, Refueling Water Storage Tank

This area is outside and will remain at ambient conditions with the exception of radiation which results from operating the recirculation system. The radiation level is based on the NRC guidelines. The specified environment is:

Temperature:	97°F
Pressure:	14.7 psia
Relative Humidity:	100%
Chemical Sprays:	No
Radiation:	4×10^6 rads
Submergence:	No

Areas 16 and 17, Diesel Generator Building

The diesel generator building is located at the northeast corner of the plant and is equipped with redundant air conditioning systems. This building will remain at ambient conditions. The specified environment is:

Temperature:	97°F
Pressure:	14.7 psia
Relative Humidity:	100%
Chemical Sprays:	No
Radiation:	No
Submergence:	No

TABLE 4: EQUIPMENT LOCATED IN NON-HOSTILE ENVIRONMENTS

Equipment	Location Area
Safety Injection System	
Safety Injection Pumps G-50A and G-50B	14
FI-912, 913, 914,	10
LT-950	14
LI-950	10
LS-69	14
Recirculation System	
FQ-500, 501	10
FY-500, 501	10
FIS-520, 521	10
LI-951	10
FI-1114A, B and C	10
Containment Spray System	
FQ-504	10
FY-504	10
FIS-522	10
PIS-511, 512, 153	10
Chemical Addition Pumps G-200A and G-200B	8
SV-600 and 601	8
Containment Isolation System	
CV-949, 957, 992	10
CS 1, 2, 3	10
Hot Leg Recirculation	
FI-1112	10
FC-1112	10
Component Cooling Water System	
TC-606	10
TR-606	10
FI-606	10

Saltwater Cooling System	
Saltwater Cooling Pumps G-13A and G-13B	9
POV-5 and 6, SV-24 and 25	9
MOV-9	9
SV-81 and 82	9
Auxiliary Feedwater System	
FI-2002A, B and C	10
FC-2002A, B and C	10
LI-450X, 451X, 452X	10
Condensate Storage Tank Level	12, 10
Control Room Air Conditioning	
A-33	10
Motors for A-31 normal filter and emergency filter dampers	10
Electrical Distribution System	
4 kV Buses 1C and 2C	10
480 V Buses 1, 2 and 3	10, 3
Motor Control Centers 1, 1A, 1B, 2, 2B, 3	10, 3, 7
Vital Buses 1, 2, 3, 4 and Utility Bus	10
DC Buses 1, 2	10, 17
Battery Chargers A, B, C and D	10, 17
Diesel Generators and Supporting Systems	16, 17
Undervoltage Relays CV6, CV7	10
MOV-850C Uninterruptible Power Supply	7
Monitoring Instrumentation	
RCS Subcooling Recorder	10
R8-2	10
Reactor Protection System	
FM-456B-X, 4578-X, 458B-X	10
YE-430A, 431A, 432A	10
LC-430A, 431A, 432A	10
LI-430, 431A, 432A	10
YE-430B, 431B, 432B	10
PC-430A/F, 431A/D, 432A/B	10
PI-430, 431, 432	10
Safety Injection Sequencer	10

Instrument Air	
PI-163, 164	10
Radiation Monitoring Instrumentation	
RLR-1200, RLR-1201	10
R-1215	3
R-1216	10

Table 5: Environmental Qualification of Electrical Equipment

REACTOR PROTECTION SYSTEM

EQUIPMENT	MANUFACTURER	LOCATION	ENV.(6)	QUAL.	METHOD	REFERENCE
FT460, 461 and 462 Steam Flow	Foxboro E13DM	Area 1 Containment	T - 291°F	300°F	Test	10
			P - 64.1	75	Test	10
			H - 100%	100%	Test	10
			C - Yes	Yes	Test	10
			R - 2E7	2.2E8	Test	11, 26
			S - No	-	-	-
FT456, 457 and 458 Feedwater Flow	Foxboro 613DM	Area 2	T - 212°F	294°F	Similar (2)	3
			P - 14.7	75	Similar (2)	3
			H - 100%	100%	Similar (2)	3
			C - No	-	-	-
			R - 3E7	-	-	-
			S - No	-	-	-
PT430, 431 and 432 Pressurizer Pressure	Foxboro E11GM	Area 1 Containment	T - 291°F	300°F	Test	10
			P - 64.1	75	Test	10
			H - 100%	100%	Test	10
			C - Yes	Yes	Test	10
			R - 2E7	2.2E8	Test	11, 26
			S - No	-	-	-
LT430, 431 and 432 Pressurizer Level	Foxboro E13DH	Area 1 Containment	T - 291°F	300°F	Test	10
			P - 64.1	75	Test	10
			H - 100%	100%	Test	10
			C - Yes	Yes	Test	10
			R - 2E7	2.2E8	Test	11, 26
			S - No	-	-	-

SAFETY INJECTION SYSTEM

EQUIPMENT	MANUFACTURER	LOCATION	ENV.	QUAL.	METHOD	REFERENCE
G-3A and B Feedwater Pumps	Byron Jackson 10 x 10 x 27 2 stage DVMX	Area 5 Area 6	T - 212°F	212°F	Analysis	1
			P - 14.7	NVS*	Analysis	1
			H - 100%	NVS	Analysis	1
			C - No	-	-	-
			R - No	-	-	-
			S - No	-	-	-
HV853A and B HV851A and B HV854A and B HV852A and B	Teledyne Republic Manufacturing 02112-002-5210 02112-003-5210	Area 5 Area 6	T - 212°F	140°F	Spec	5
			P - 14.7	NVS	Spec	5
			H - 100%	100%	Spec	5
			C - No	-	-	-
			R - No	-	-	-
			S - No	-	-	-
CV875A and B Feedwater Pump Recirculation	Solenoid ASCO WPHT 8314	Area 5 Area 6	T - 212°F	650°F (1)	Sim; Anal (2)	2, 3, 1
			P - 14.7	65	Sim; Anal	2, 3, 1
			H - 100%	100%	Sim; Anal	2, 3, 1
			C - No	-	-	-
			R - No	-	-	-
			S - No	-	-	-
CV36 and 37 (SV17 and 18) Feedwater to Condenser	Solenoid ASCO WPLB 8300 B59	Area 5 Area 6	T - 212°F	650°F (1)	Analysis	2, 3, 1
			P - 14.7	65	Analysis	2, 3, 1
			H - 100%	100%	Analysis	2, 3, 1
			C - No	-	-	-
			R - No	-	-	-
			S - No	-	-	-
FT912, 913 and 914 SI Flow	Foxboro 630-2AS	Area 2	T - 212°F	NVS	Analysis	3
			P - 14.7	NVS	Analysis	3
			H - 100%	NVS	Analysis	3
			C - No	-	-	-
			R - 3E7	9.9E5	Analysis	3
			S - No	-	-	-

* NVS = No Value Specified

SAFETY INJECTION SYSTEM

EQUIPMENT	MANUFACTURER	LOCATION	ENV.	QUAL.	METHOD	REFERENCE
MOV 850A, B and C SI Valves	Crane Valves Limitorque SMA-1-40	Area 1 Containment	T - 291°F	329°F	Analysis	2, 1
			P - 64.1	105	Analysis	2, 1
			H - 100%	Steam	Analysis	2, 1
			C - Yes	Yes	Analysis	2, 1
			R - 2E7	2E8	Analysis	2, 1
			S - No	-	-	-

RECIRCULATION SYSTEM

EQUIPMENT	MANUFACTURER	LOCATION	ENV.	QUAL.	METHOD	REFERENCE
G-45A and B Recirculation Pumps	Chempump GPS-60L-46H-3T	Area 1 Containment	T - 291°F	300°F (3)	Analysis	2
			P - 64.1	165 (3)	Analysis	2
			H - 100%	100%	Analysis	2
			C - Yes	Yes	Analysis	2
			R - 2E7	5.35E7	Analysis	2
			S - Yes	Yes	Analysis	2
MOV 866A and B	Darling Valves Limitorque SMB000-5	Area 1 Containment	T - 291°F	329°F	Analysis	2, 3, 1
			P - 64.1	105	Analysis	2, 3, 1
			H - 100%	Steam	Analysis	2, 3, 1
			C - Yes	Yes	Analysis	2, 3, 1
			R - 2E7	2E8	Analysis	2, 3, 1
			S - No	-	-	-
FT500 and 501 Recirculation Flow	Foxboro E13DM	Area 1 Containment	T - 291°F	300°F	Test	10
			P - 64.1	75	Test	10
			H - 100%	100%	Test	10
			C - Yes	Yes	Test	10
			R - 2E7	2.2E8	Test	11, 26
			S - No	-	-	-
LC951 Sump Level	Gems Corp LS 800	Area 1 Containment	T - 291°F			
			P - 64.4			
			H - 100%			
			C - Yes			
			R - 2E7			
			S - Yes			
MOV/LCV 1100B and D MOV/LCV 1100C Charging Pump Suction	Darling Valves Limitorque SMB-00-10	Area 8	T - 110°F	329°F	Analysis	2, 3, 1
			P - 14.7	105	Analysis	2, 3, 1
			H - 100%	Steam	Analysis	2, 3, 1
			C - No	-	-	-
			R - 4E6	2E8	Analysis	2, 3, 1
			S - No	-	-	-

RECIRCULATION SYSTEM

EQUIPMENT	MANUFACTURER	LOCATION	ENV.	QUAL.	METHOD	REFERENCE
G-8A and B Charging Pumps	Pacific Pumps 2" Type Z 12 Stage	Area 8	T - 110°F	212°F	Analysis	1
			P - 14.7	NVS	Analysis	1
			H - 100%	NVS	Analysis	1
			C - No	-	-	-
			R - 4E6	10^7	Analysis	2, 1
			S - No	-	-	-
LS-73 Sump Hi-Hi Alarm	Magnetrol A 153F-MPK-TDM	Area 1 Containment	T - 291°F			
			P - 64.1			
			H - 100%			
			C - Yes			
			R - 2E7			
			S - Yes			
MOV 18 and 19 Charging Pump Discharge	Velan Valves Limitorque SMB-00	Area 1	T - 110°F	329°F	Similar (2)	2, 3
			P - 14.7	105	Similar	2, 3
			H - 100%	Steam	Similar	2, 3
			C - No	-	-	-
			R - 4E6	2E8	Similar	2, 3
			S - No	-	-	-
FCV 1115 D, E and F Recirculation Flow Cotrol	Honeywell Positioner IS HE-1	Area 1	T - 110°F			
			P - 14.7			
			H - 100%			
			C - No			
			R -			
			S - No			
FT 1114A B, and C Recirculation Injection Flow	Foxboro 13HA	Area 1	T - 110°F	AMB	Exp	-
			P - 14.7	ATM	Exp	-
			H - 100%	AMB	Exp	-
			C - No	-	-	-
			R - 4E7	3E6	Spec	12
			S - No	-	-	-

RECIRCULATION SYSTEM

EQUIPMENT	MANUFACTURER	LOCATION	ENV.	QUAL.	METHOD	REFERENCE
MOV 356, 357 and 358 Recirculation Injection	Edwards Valves Limitorque SMB-00-25	Area 1 Containment	T - 291°F	329°F	Analysis	2, 3
			P - 64.1	105	Analysis	2, 3
			H - 100%	Steam	Analysis	2, 3
			C - Yes	Yes	Analysis	2, 3
			R - 2E7	2E8	Analysis	2, 3
			S - No	-	-	-

CONTAINMENT SPRAY

EQUIPMENT	MANUFACTURER	LOCATION	ENV.	QUAL.	METHOD	REFERENCE
G-27A and B Refueling Water Pumps	Worthington 4HN-172	Area 14	T - 97°F	248°F	Analysis	2, 3, 1
			P - 14.7	NVS	Analysis	2, 3, 1
			H - 100%	NVS	Analysis	2, 3, 1
			C - No	-	-	-
			R - 4E6	1E7 (4)	Analysis	2, 3, 1
			S - No	-	-	-
MOV 883 RWST Isolation	Darling Valve Limitorque SMB-00	Area 14	T - 97°F	329°F	Similar (2)	2, 3
			P - 14.7	105	Similar	2, 3
			H - 100%	Steam	Similar	2, 3
			C - No	-	-	-
			R - 4E6	2E8	Similar	2, 3
			S - No	-	-	-
MOV 880 Spray/Recirculation Crosstie	Darling Valve Limitorque SMB-00	Area 1	T - 110°F	329°F	Similar (2)	2, 3
			P - 14.7	105	Similar	2, 3
			H - 100%	Steam	Similar	2, 3
			C - No	-	-	-
			R - 4E6	2E8	Similar	2, 3
			S - No	-	-	-
CV517 and 518 Spray Flow Control	EBV Systems D-6-300-7	Area 1	T - 97°F	110°F	c of c	15
			P - 14.7	ATM	c of c	15
			H - 100%	100%	c of c	15
			C - No	-	-	-
			R - 4E6	2E7	c of c	15
			S - No	-	-	-
FT 504 Spray Flow	Foxboro E13DM	Area 1	T - 97°F	300°F	Test	10
			P - 14.7	75	Test	10
			H - 100%	100%	Test	10
			C - No	-	-	-
			R - 4E6	2.2E8	Test	11, 26
			S - No	-	-	-

CONTAINMENT SPRAY

EQUIPMENT	MANUFACTURER	LOCATION	ENV.	QUAL.	METHOD	REFERENCE
CV82 and 114 SV128 and 118 Spray Isolation	Solenoid ASCO WPLB 8300 B59	Area 1 Containment	T - 291°F	650°F (1)	Analysis	2, 3
			P - 64.1	64	Analysis	2, 3
			H - 100%	100%	Analysis	2, 3
			C - Yes	Yes	Analysis	2, 3
			R - 2E7	NVS (5)	Analysis	2, 3
			S - No	-	-	-
PT501, 502 and 503 Containment Pressure	Foxboro E11GM	Area 1	T - 97°F	300°F	Test	10
			P - 14.7	75	Test	10
			H - 100%	100%	Test	10
			C - No	-	-	-
			R - 3E7	2.2E8	Test	11, 26
			S - No	-	-	-

CONTAINMENT ISOLATION

EQUIPMENT	MANUFACTURER	LOCATION	ENV.	QUAL.	METHOD	REFERENCE
CV102, 104 and 106						
SV108, 110 and 112	ASCO WPLB 8300 B59	Area 1	T - 291°F	650°F (1)	Analysis	2, 3
Sphere Sump Discharge		Containment	P - 64.1	65	Analysis	2, 3
RCS Dr Tk Discharge			H - 100%	100%	Analysis	2, 3
RCS Dr Tk Vent			C - Yes	Yes	Analysis	2, 3
			R - 2E7	NVS (5)	Analysis	2, 3
			S - No			
CV103, 105 and 107	ASCO 8300 B61	Area 1	T - 110°F	650°F (1)	Similar (2)	2, 3
SV109, 111 and 113			P - 14.7	65	Similar	2, 3
Sphere Sump Discharge			H - 100%	100%	Similar	2, 3
RCS Dr Tk Discharge			C - No	-	-	-
RCS Dr Tk Vent			R - 4E6	NVS (5)	Similar	2, 3
			S - No	-	-	-
CV146 and 147						
SV1212-6 and 1212-7	ASCO WPLB 8300 B59	Area 1	T - 291°F	650°F (1)	Analysis	2, 3
Sphere Air Sample		Containment	P - 64.1	65	Analysis	2, 3
			H - 100%	100%	Analysis	2, 3
			C - Yes	Yes	Analysis	2, 3
			R - 2E7	NVS (5)	Analysis	2, 3
			S - No	-	-	-
SV1212-8 and 1212-9	ASCO HT X 8210 27	Area 1	T - 110°F			
Sphere Air Sample			P - 14.7			
			H - 100%			
			C - No			
			R - 4E6			
			S - No			
CV117, 118 and 119	ASCO WPLB 8300 B61VR	Area 2	T - 212°F	650°F (1)	Similar (2)	2, 3
SV119, 120 and 121			P - 14.7	65	Similar	2, 3
Steam Gen. Steam Sample			H - 100%	100%	Similar	2, 3
			C - No	-	-	-
			R - 3E7	NVS (5)	Similar	2, 3
			S - No	-	-	-

CONTAINMENT ISOLATION

EQUIPMENT	MANUFACTURER	LOCATION	ENV.	QUAL.	METHOD	REFERENCE
CV120, 121 and 122 SV122, 123 and 124 Steam Gen. Blowdown Sample	ASCO WP 8300 B61R	Area 2	T - 212°F	650°F (1)	Similar (2)	2, 3
			P - 14.7	65	Similar	2, 3
			H - 100%	100%	Similar	2, 3
			C - No	-	-	-
			R - 3E7	NVS (5)	Similar	2, 3
			S - No	-	-	-
CV123 SV125 Service Air	ASCO WP 8300 B61R	Area 1	T - 97°F	650°F (1)	Similar (2)	2, 3
			P - 14.7	65	Similar	2, 3
			H - 100%	100%	Similar	2, 3
			C - No	-	-	-
			R - 3E7	NVS (5)	Similar	2, 3
			S - No	-	-	-
CV537 Service Water	Contromatic C-9922-DC Solenoid ASLO WP 8317 35	Area 1 Containment	T - 291°F	272°F	Spec	28
			P - 64.1	61.1	Spec	28
			H - 100%	100%	Spec	28
			C - Yes	Yes	Spec	28
			R - 2E7	1E8	Spec	28
			S - No	-	-	-
CV115 SV126 Service Water	ASCO WPLB 8300 B61RU	Area 1	T - 97°F	650°F (1)	Similar (2)	2, 3
			P - 14.7	65	Similar	2, 3
			H - 100%	100%	Similar	2, 3
			C - No	-	-	-
			R - 3E7	NVS (5)	Similar	2, 3
			S - No	-	-	-
SV702B and D Cold Leg Vent	Morotta Valve Co. Model MV 583H-4A	Area 1 Containment	T - 291°F			
			P - 64.1			
			H - 100%			
			C - Yes			
			R - 2E7			
			S - No			

CONTAINMENT ISOLATION

EQUIPMENT	MANUFACTURER	LOCATION	ENV.	QUAL.	METHOD	REFERENCE
SV702A and C Cold Leg Vent	Morotta Valve Co. Model MV 583H-4A	Area 1	T - 97°F P - 14.7 H - 100% C - No R - 3E7 S - No			
POV 9 and 10 SV29 and 30 Sphere Purge	ASCO 8345	Area 1	T - 97°F P - 14.7 H - 100% C - No R - 3E7 S - No	AMB ATM AMB - NVS (5) -	Exp Exp Exp - Similar (2) -	- - - - 2, 3 -
CV40 and 116 SV19 and 127 Sphere Vent	ASCO WPLB 8300 B59	Area 1 Containment	T - 291°F P - 64.1 H - 100% C - Yes R - 2E7 S - No	650°F (1) 65 100% Yes NVS (5) -	Analysis Analysis Analysis Analysis Analysis -	2, 3 2, 3 2, 3 2, 3 2, 3 -
CV10 SV28 Sphere Vent	ASCO WPLB 8300 B59	Area 1	T - 97°F P - 14.7 H - 100% C - No R - 3E7 S - No	650°F (1) 65 100% - NVS (5) -	Analysis Analysis Analysis - Analysis -	2, 3 2, 3 2, 3 - 2, 3 -
CV533 and 536 Press Relief Tank RCS Drain Tank	Contromatic C-9922-DC Solenoid ASCO WPHT 8370 93	Area 1 Containment	T - 291°F P - 64.1 H - 100% C - Yes R - 2E7 S - No	272°F 61.1 100% Yes 1E8 -	Spec Spec Spec Spec Spec -	28 28 28 28 28 -

CONTAINMENT ISOLATION

EQUIPMENT	MANUFACTURER	LOCATION	ENV.	QUAL.	METHOD	REFERENCE
CV534 and 535 Press Relief Tank RCS Drain Tank	Contromatic C-9922-DC Solenoid ASCO WPHT 8370 93	Area 1	T - 110°F	120°F	Spec	28
			P - 14.7	NVS	Spec	28
			H - 100%	100%	Spec	28
			C - No	-	-	-
			R - 4E6	2.5E7	Spec	28
			S - No	-	-	-
CV525 and 527 RCS Letdown RCP Sealwater	EBV D-2-300-6 EBV D-3-150-14	Area 1 Containment	T - 291°F	272°F	c of c	15
			P - 64.1	61.1	c of c	15
			H - 100%	100%	c of c	15
			C - Yes	Yes	c of c	15
			R - 2E7	3E7	c of c	15
			S - No	-	-	-
CV526 and 528 RCS Letdown RCP Sealwater	EBV D-2-300-6 EBV D-3-150-14	Area 1	T - 110°F	110°F	c of c	15
			P - 14.7	ATM	c of c	15
			H - 100%	100%	c of c	15
			C - No	-	-	-
			R - 4E6	2E7	c of c	15
			S - No	-	-	-
CV287 RCS Letdown	BS&B 70-18-9 DRTX Solenoid ASCO	Area 1 Containment	T - 291°F			
			P - 64.1			
			H - 100%			
			C - Yes			
			R - 2E7			
			S - Yes			
CV202, 203 and 204 RCS Letdown	ASCO WPLB 8300 B59	Area 1 Containment	T - 291°F	650°F (1)	Analysis	2, 3
			P - 64.1	65	Analysis	2, 3
			H - 100%	100%	Analysis	2, 3
			C - Yes	Yes	Analysis	2, 3
			R - 2E7	NVS (5)	Analysis	2, 3
			S - No	-	-	-

CONTAINMENT ISOLATION

EQUIPMENT	MANUFACTURER	LOCATION	ENV.	QUAL.	METHOD	REFERENCE
CV532	Contromatic C-9922-DC	Area 1	T - 110°F	120°F	Spec	28
Press Relief Tank	ASCO WPHTX 8370 93		P - 14.7	NVS	Spec	28
			H - 100%	100%	Spec	28
			C - No	-	-	-
			R - 4E6	2E7	Spec	28
			S - No	-	-	-
CV515 and 516	EBV D-6-150-18	Area 1	T - 97°F	97°F	c of c	15
Air Units			P - 14.7	ATM	c of c	15
Cooling Water			H - 100%	100%	c of c	15
			C - No	-	-	-
			R - 4E6	2E7	c of c	15
			S - No	-	-	-
PT 1120A, B and C	Foxboro E11GM	Area 1	T - 97°F	300°F	Test	10
PT 1121A, B and C			P - 14.7	75	Test	10
			H - 100%	100%	Test	10
			C - No	-	-	-
			R - 3E7	2.2E8	Test	11, 26
			S - No	-	-	-

HOT LEG RECIRCULATION

EQUIPMENT	MANUFACTURER	LOCATION	ENV.	QUAL.	METHOD	REFERENCE
FCV 1112 HLR Flow Control	ASCO WPHT 8314 6	Area 1	T - 110°F	120°F	Analysis	1
			P - 14.7	NVS	Analysis	1
			H - 100%	NVS	Analysis	1
			C - No	-	-	-
			R - 4E6	-	-	-
			S - No	-	-	-
FIT 1112 HLR Flow	Brooks 5523A	Area 1	T - 110°F			
			P - 14.7			
			H - 100%			
			C - No			
			R - 4E6			
			S - No			
CV304 Loop A Charging Line	ASCO WPHT 8314 6	Area 1 Containment	T - 291°F	NVS	Analysis	1
			P - 64.1	NVS	Analysis	1
			H - 100%	NVS	Analysis	1
			C - Yes	NVS	Analysis	1
			R - 2E7	-	-	-
			S - No	-	-	-
CV305 Pressurizer Spray Line	ASCO WPHT 8314 6	Area 1 Containment	T - 291°F	NVS	Analysis	1
			P - 64.1	NVS	Analysis	1
			H - 100%	NVS	Analysis	1
			C - Yes	NVS	Analysis	1
			R - 2E7	(4)	-	-
			S - No	-	-	-
PCV 430C and H Loop A and B	BS&B 70-18-9 DRTX Foxboro 69 TA-1	Area 1 Containment	T - 291°F	NVS	Analysis	1
			P - 64.1	NVS	Analysis	1
			H - 100%	NVS	Analysis	1
			C - Yes	NVS	Analysis	1
			R - 2E7	-	-	-
			S - No	-	-	-

CHEMICAL AND VOLUME CONTROL SYSTEM

EQUIPMENT	MANUFACTURER	LOCATION	ENV.	QUAL.	METHOD	REFERENCE
CV410 and 411 VCT Inlet	ASCO LB 8316 12	Area 8	T - 97°F P - 14.7 H - 100% C - No R - 4E6 S - No			

STEAM DUMP

EQUIPMENT	MANUFACTURER	LOCATION	ENV.	QUAL.	METHOD	REFERENCE
CV76, 77, 78 and 79 SV85, 86, 87 and 88 ATM Steam Dump	Solenoid Valvair 5682-2	Area 1	T - 97°F P - 14.7 H - 100% C - No R - 3E7 S - No			

COMPONENT COOLING WATER SYSTEM

EQUIPMENT	MANUFACTURER	LOCATION	ENV.	QUAL.	METHOD	REFERENCE
G15A, B and C Component Cooling Pumps	Pacific 6 x 14 Type DS	Area 8	T - 97°F	212°F	Analysis	1
			P - 14.7	NVS	Analysis	1
			H - 100%	NVS	Analysis	1
			C - No	-	-	-
			R - 4E6	-	-	-
			S - No	-	-	-
MOV 720A and B Component Cooling Ht Ex Outlet	Crane Valves Limitorque SMB-00-5	Area 8	T - 97°F	329°F	Similar (2)	2, 3
			P - 14.7	105	Similar	2, 3
			H - 100%	Steam	Similar	2, 3
			C - No	-	-	-
			R - 4E6	2E8	Similar	2, 3
			S - No	-	-	-
CV737 A and B Recirculation Ht Ex	EBV Systems D-4-150-18	Area 8	T - 97°F	110°F	c of c	15
			P - 14.7	ATM	c of c	15
			H - 100%	100%	c of c	15
			C - No	-	-	-
			R - 4E6	2E7	c of c	15
			S - No	-	-	-
TE-606 Cooling Water	Foxboro DB-13V-26W	Area 8	T - 97°F			
			P - 14.7			
			H - 100%			
			C - No			
			R - 4E6			
			S - No			
FT606	Foxboro 13A	Area 8	T - 97°F	AMB	Exp	-
			P - 14.7	ATM	Exp	-
			H - 100%	AMB	Exp	-
			C - No	-	-	-
			R - 4E6	1.9E4	Similar (2)	3
			S - No	-	-	-

AUXILIARY FEEDWATER SYSTEM

EQUIPMENT	MANUFACTURER	LOCATION	ENV.	QUAL.	METHOD	REFERENCE
G-10 Auxiliary Feed Pump	Pacific Pump JTC-2"	Area 6	T - 212°F P - 14.7 H - 100% C - No R - No S - No			
FT2002A, B and C Auxiliary Feed Flow	Controlatron 240N-3CS40	Area 2	T - 212°F P - 14.7 H - 100% C - No R - 3E7 S - No			
LT 450X, 451X and 452X SG Level	Foxboro NE13DM	Area 1 Containment	T - 291°F P - 64.1 H - 100% C - Yes R - 2E7 S - No	300°F 75 100% Yes 2.2E8 -	Test Test Test Test Test -	10 10 10 10 11, 26 -

ELECTRICAL DISTRIBUTION SYSTEM

EQUIPMENT	MANUFACTURER	LOCATION	ENV.	QUAL.	METHOD	REFERENCE
Cable	GE Vulkene	Various	T - 291°F	392°F	Test	3, 4
			P - 64.1	80	Test	3
			H - 100%	100%	Test	3
			C - Yes	Yes	Vendor Data	6
			R - 2E7	1E8	Test	3
			S - Yes	Yes	Vendor Data	6
Cable	GE	Various	T - 291°F	348°F	Test	7
			P - 64.1	135	Test	7
			H - 100	Steam	Test	7
			C - Yes	Yes	Test	7
			R - 2E7	2.2E8	Test	7
			S - Yes	Yes	Test	24
Cable	Raychem	Various	T - 97°F	358°F	Test	8
			P - 14.7	149	Test	8
			H - 100%	Steam	Test	8
			C - No	-	-	-
			R - 3E7	2E8	Test	8
			S - No	-	-	-
Cable	Rockbestos	Various	T - 291°F	346°F	Test	9
			P - 64.1	128	Test	9
			H - 100%	Steam	Test	9
			C - Yes	Yes	Test	9
			R - 2E7	2E8	Test	9
			S - No	-	-	-
Penetrations	Viking	Area 1	T - 291°F	272°F	Spec	17, 18, 19
			P - 64.1	68	Test	20
			H - 100%	High	Spec	17, 18, 19
			C - Yes			
			R - 2E7			
			S - No			

ELECTRICAL DISTRIBUTION SYSTEM

EQUIPMENT	MANUFACTURER	LOCATION	ENV.	QUAL.	METHOD	REFERENCE
Penetrations	Conax	Area 1	T - 291°F	340°F	Test	30, 31
			P - 64.1	125	Test	30, 31
			H - 100%	100%	Test	30, 31
			C - Yes	Yes	Test	30, 31
			R - 2E7	2.2E8	Test	30, 31
			S - No	-	-	-
Penetrations	Amphenol	Area 1	T - 291°F	300°F	Test; Anal	21, 27
			P - 64.1	70	Test	21
			H - 100%	100%	Test	21
			C - Yes	Yes	Test	21
			R - 2E7	1E8	Test	22
			S - No	-	-	-
Cable Splices	Raychem	Various	T - 291°F	358°F	Test	23
			P - 64.1	134	Test	23
			H - 100%	100%	Test	23
			C - Yes	Yes	Test	23
			R - 2E7	2E8	Test	23
			S - No	-	-	-
Motor Control Center 2A	Westinghouse Class II-350	Area 8	T - 97°F			
			P - 14.7			
			H - 100%			
			C - No			
			R - 4E6			
			S - No			

REACTOR COOLANT SYSTEM

EQUIPMENT	MANUFACTURER	LOCATION	ENV.	QUAL.	METHOD	REFERENCE
CV530 and 531 Pressurizer Block Valves	ASCO 8316	Area 1 Containment	T - 291°F P - 64.1 H - 100% C - Yes R - 2E7 S - No			
CV545 and 546 Pressurizer PORV	ASCO 8316	Area 1 Containment	T - 291°F P - 64.1 H - 100% C - Yes R - 2E7 S - No			
Limit Switches Pressurizer PORV and Relief Valves	NAMCO EA180	Area 1 Containment	T - 291°F P - 64.1 H - 100% C - Yes R - 2E7 S - No	340°F 85 100% Yes 2E8 -	Test Test Test Test Test -	32 32 32 32 32 -

MONITORING INSTRUMENTATION

EQUIPMENT	MANUFACTURER	LOCATION	ENV.	QUAL.	METHOD	REFERENCE
RCTD's TE400, 401, 402 A, B, C TE410, 411, 412 A, B, C TE420, 421, 422 A, B, C	Weed Instrument Model 2004	Area 1 Containment	T - 291°F	291°F	c of c	13
			P - 64.1	64.1	c of c	13
			H - 100%	100%	c of c	13
			C - Yes	Yes	c of c	13
			R - 2E7	3.5E6	c of c	13
			S - No	-	-	-
PT2 Steam Pressure	Honeywell 737 NISI	Area 2	T - 212°F	Amb	Experience	-
			P - 14.7	Atm	Experience	-
			H - 100%	Amb	Experience	-
			C - No	-	-	-
			R - 3E7	2E6	Similar (2)	3
			S - No	-	-	-
Subcooling Recorder Pressure Transmitter	Foxboro E11GM	Area 1 Containment	T - 291°F	300°F	Test	10
			P - 64.1	75	Test	10
			H - 100%	100%	Test	10
			C - Yes	Yes	Test	10
			R - 2E7	2.2E8	Test	11, 26
			S - No	-	-	-

INSTRUMENT AIR

EQUIPMENT	MANUFACTURER	LOCATION	ENV.	QUAL.	METHOD	REFERENCE
CV41 Service Air Isolation PCI	U.S. Gauge PIC 07M 12CB-315	Area 6	T - 212°F P - 14.7 H - 100% C - No R - No S - No			
PS56, 57 and 58 Compressed Air Header	United Electric	Area 6	T - 212°F P - 14.7 H - 100% C - No R - No S - No			
SV147 Emergency Compressor Start		Area 6	T - 212°F P - 14.7 H - 100% C - No R - No S - No			
PS119 Emergency Compressor Start	Square "D" GH62 9013	Area 6	T - 212°F P - 14.7 H - 100% C - No R - No S - No			
K-1A, B and C Compressors	Chicago Pneumatic 12 x 11 TDO-B2	Area 6	T - 212°F P - 14.7 H - 100% C - No R - No S - No			

INSTRUMENT AIR

EQUIPMENT	MANUFACTURER	LOCATION	ENV.	QUAL.	METHOD	REFERENCE
Emergency Compressor	Worthington 25 BN-24	Area 6	T - 212°F P - 14.7 H - 100% C - No R - No S - No			
PCV40 Instrument Air Isolation	Fisher 1805-3	Area 6	T - 212°F P - 14.7 H - 100% C - No R - No S - No			
SV105, 106 and 107 Instrument Air Dryer		Area 6	T - 212°F P - 14.7 H - 100% C - No R - No S - No			
PT11 and 12 Instrument and Service Air	Honeywell Y737NI-SI	Area 6	T - 212°F P - 14.7 H - 100% C - No R - No S - No			

RADIATION MONITORING SYSTEM

EQUIPMENT	MANUFACTURER	LOCATION	ENV.	QUAL.	METHOD	REFERENCE
R-1232 Containment	Tracer Lab WJ-12	Area 1 Containment	T - 291°F P - 64.1 H - 100% C - Yes R - 2E7 S - No			

REFERENCES

1. NUS 1854
2. Amendment 30 SONGS 1 FSAR
3. Amendment 47 SONGS 1 FSAR
4. Environmental Qualification of Safety Related Electrical Equipment dated February 24, 1978
5. Specification 82-9010, 6/6/75
6. General Electric Wire and Cable Product Data, Vulkene Industrial Control Cable, September 15, 1961
7. FIRL Test Report F-C3713-2A, May, 1975
8. FIRL Test Report F-C4033-1, January, 1975
9. The Rockbestos Company, Qualification of Firewall III Class IE Electric Cables, February 1, 1977
10. Foxboro Test Report Nos. T3-1013 and T3-1013 (Supplementary)
11. Foxboro Test Report No. T3-1068
12. SCE Purchase Order H2205004, 8/28/75
13. Weed Instrument Co. Inc. Certificate of Compliance
14. International Instruments, Certificate of Compliance dated 11/16/77
15. EBV Systems Division, Certificate of Compliance
16. Foxboro Company, Statement of Conformance dated 11/14/77
17. Specification BSO-3042, 7/20/64
18. Specification BSO-3043, 5/6/64
19. Specification BSO-3280
20. SONGS 1 FSAR, Volume IV, Section 4.3.6.4

21. Amphenol Technical Report 123-1247

22. Amphenol Technical Report 123-1260

23. FIRL Test Report F-C4033-3, January, 1975

24. Specification SO 23-304-11

25. Specification SEP 404, July, 1976

26. Foxboro Test Report No. T3-1097

27. Amphenol letter from Paul T. Smith to SCE Att: D. Nanda dated August 31, 1977

28. Specification SEP-402, December, 1975

29. Specification SO1 IS-01, September 27, 1979

30. IPS 525.1 Design Qualification Report for Low Voltage Power and Control Electric Penetration Assemblies, Conax Corporation

31. IPS 525.2 Design Qualification Report for Low Voltage Instrumentation Electric Penetration Assemblies, Conax Corporation

32. Qualification of NAMCO Controls Limit Switch Model EA 180 dated September 5, 1978

NOTES

(1) The temperature qualification parameter specified represents that value at which constituent parts constructed of ferrous material will degrade and does not include that value for the valves brass body and organic constituent parts. It is not expected that the brass body will degrade within the required operation time of the valve, if at all. Failure of organic material will not impair the deenergizing of the solenoid valve, allowing its associated control valve to assume its fail-safe position (see Reference 2 Page 6A-102).

(2) The use of "Similarity" indicates that the identified equipment is similar to that already qualified by analysis in References 2 and 3.

(3) The pump qualification temperature and pressure values represent the limiting value specified in Reference 2 which corresponds to the pump casing.

(4) The qualification value is for the pump motor as described in References 2 and 3. Specification for the pump mechanical seals specifies a recirculation radiation value of 10^6 rads.

(5) Failure of constituent parts due to radiation damage is inconsequential to proper operation of the component (See Reference 2 Page 6A-102).

(6) Environments specified are from Table 3.

Table 6: Equipment Located in Hostile Environments For Which Qualification Is Not Available

Reactor Protection System

FT-456, 457, 458
These transmitters provide an input to the reactor trip on steam flow-feedwater flow mismatch. In the event of a steam or feedwater line break this trip will occur almost immediately. Therefore, these transmitters will have performed their function prior to being exposed to any high temperature if the break is in Area 2. Furthermore, additional instrumentation which would not be affected by a break in this location is available to provide a reactor trip such as pressurizer pressure or level. For a break in any other area these transmitters would not be affected. These transmitters are not required following a LOCA and, therefore, the radiation is not applicable.

Safety Injection System

HV-853A, B, 851A, B, 854A, B, 852A, B
These valves are used to transfer the feedwater pumps from feedwater service to emergency core cooling service. In the event of a feedwater or steam line break in the vicinity of the valves, the environment could be saturated steam at 212°F. The valves are covered and would not be expected to be exposed to this temperature. Moreover, since the two trains are at opposite sides of the turbine building, any given break could only affect one train. The safety analyses for the plant are based on one train of emergency core cooling. Therefore, in the unlikely event that these valves failed to operate in the break environment, the core would be adequately cooled.

FT-912, 913 and 914
These transmitters provide surveillance of safety injection flow, however, they are not required for proper operation of the safety injection system. In the event of steam or feedwater line break in Area 2, these transmitters could be exposed to 212°F saturated steam. In the event of a LOCA, safety injection is terminated within the first half hour, before these transmitters would be exposed to a high radiation environment. If the transmitters fail, the operator can still establish that safety injection flow has stopped, as would be the case for a steam or feedwater line break, by monitoring RWST level which he is required to do by the procedure.

Recirculation System

LC-951, LS-73
These instruments provide indication of containment sump level. Qualification information is not available on these instruments. However, in accordance with the operating procedure these instruments are not relied on by themselves for a specific operator action. The operator is instructed to also monitor RWST level on LI-950 and LS-69. These latter instruments are not located in hostile environments and, as such, would be operable. Therefore, in the event LC-951 or LS-73 fails, adequate information is available to the operator. In addition, in connection with implementation of TMI related requirements new containment sump level indication will be installed.

FCV-1115D, E, F
These valves provide flow control to the injection lines for long term recirculation. Nineteen hours following initiation of safety injection the Hot Leg Recirculation System is actuated. At that time the flow control valves will be modulated for a reduced flow to the core. It will be necessary to have these valves qualified for 19 hour operation. Qualification of this component has been suspended pending consideration in connection with the Systematic Evaluation Program as discussed in SCE's letter dated August 10, 1978. The NRC Staff's response to this letter was provided by letter dated October 16, 1978.

Containment Isolation System

CV-287
This containment isolation valve may be submerged following a LOCA. However, there are other containment isolation valves downstream of this valve which are also closed following a LOCA and which will ensure containment isolation. Therefore, plant modifications associated with this valve have been suspended pending consideration in connection with the Systematic Evaluation Program as discussed in SCE's letter to the NRC dated August 10, 1978. The NRC Staff's response to this letter was provided by letter dated October 16, 1978.

CV-537, 533, 536, 525, 527
These valves provide containment isolation of the pressurizer relief tank, RCS drain tank, service water, RCS letdown and RCP sealwater. The containment pressure and temperature values specified for these valves are the original specification values. These values are less than 10% lower than the conservatively calculated values for the containment environment and as such the valves would be expected to close. Moreover, the lines containing these isolation valves also have isolation valves located outside containment which have been qualified for the environment outside containment. Failure of the valves inside containment would not prevent isolation of the line by the valve outside containment.

SV-1212-8, 1212-9
Evaluation of the environmental qualification of these solenoid valves is continuing.

SV-702A, B, C, D
These valves are used to periodically vent the safety injection lines during normal operation to reduce the potential for water hammer in these lines. Except when the lines are being vented, these valves are closed. Following an accident these valves remain closed and are not required to change position. Therefore, these lines will remain isolated.

Hot Leg Recirculation System

FCV-1112, CV-304, CV-305, PCV-430C, PCV-430H, FIT-1112
These components are part of the Hot Leg Recirculation System which is provided to protect against the possibility of boron precipitation in the reactor for the case of a cold leg LOCA. This system is not required for an MSLB, FWLB or LOCA other than in a cold leg. Qualification of components within this system has been suspended pending consideration in connection with the Systematic Evaluation Program as discussed in SCE's letter to the NRC dated August 10, 1978. The NRC Staff's response to this letter was provided by letter dated October 16, 1978. Pending completion of this qualification, an alternate hot leg recirculation path is available as discussed in the LOCA Operating Instruction.

Steam Dump System

CV-76, 77, 78 and 79
These valves are the atmospheric steam dump valves and are used to dump steam in the event the main condenser is not available. The valves are shielded by the Sphere Enclosure Building and by steel enclosures designed to protect them from high energy pipe breaks and, as such, would not be expected to be exposed to the high radiation calculated for this area of the plant. However, in the event they did fail after prolonged exposure, the main steam safety valves would be available. The atmospheric dump valves would not be affected by a steam or feedwater line break at any location.

Component Cooling Water System

G-15A, B and C
The component cooling water system provides cooling to the recirculation heat exchanger. During the recirculation phase of emergency core cooling, the component cooling water pumps will be exposed to radiation from the recirculation loop. However, shielding from components in the area, such as the surge tank, should reduce the dose considerably from the 4×10^6 rads which has been assumed for the recirculation loop. Moreover, three pumps are available, whereas only one pump has to be operable at any given time.

TE-606, FT-606
These instruments are used only to monitor the component cooling water system. They are not required for any automatic action or for the component cooling water system to function.

Auxiliary Feedwater System

G-10
This pump could experience a 212°F saturated steam environment in the event of a steam line break in the vicinity of the pump. Although specific qualification for this environment is not available, it is not expected that this environment would affect operability of the pump. However, in the event this pump did fail, the other steam driven auxiliary feedwater pump would be available.

FT-2002A, B, C
These flow transmitters were recently installed to meet TMI related requirements and were purchased to control grade requirements. These transmitters are scheduled to be replaced with qualified transmitters by January 1, 1981.

Electrical Distribution System

Viking Penetrations
Evaluation of the environmental qualification of these penetrations is continuing.

Motor Control Center 2A
MCC-2A is located within the Reactor Auxiliary Building. The post-accident environment within this building includes a radiation dose of 4×10^6 rads associated with recirculation equipment. The safety related equipment receiving power through this motor control center is actuated upon initiation of safety injection and containment spray signals and do not require further actuation. During the recirculation phase this motor control center is not required for powering any safety related equipment.

Reactor Coolant System

CV-530, 531, 545 and 546
Evaluation of the environmental qualification of these components is continuing.

Monitoring Instrumentation

RCTD's
These instruments are used to monitor the RCS for adequate core cooling following an accident. In the event of an MSLB the NRC Guidelines identify the appropriate radiation dose as 2×10^6 rads. The temperature detectors are qualified for at least 3.5×10^6 rads and therefore are acceptable following an MSLB. Following a LOCA the dose is specified as 2×10^7 rads. This dose is due to a large break LOCA with a TID 14844 source term. However, for a large break LOCA safety injection and recirculation are maintained and there is no real need for the RCTD's. These instruments are more important for a small break LOCA to ensure adequate core cooling and appropriate safety injection operation. For the small break case, the dose will not be as high and the RCTD's would be expected to remain operable.

PT-2
This component provides indication of steam line pressure and is utilized by the operator to identify a loss of secondary coolant and to monitor steam pressure following a small break LOCA. In the event of a secondary line break, this instrument will not be exposed to a hostile environment unless the break is in Area 2. If the break is in Area 2 and the instrument fails due to high temperature, the operator can use other information such as containment

radiation to determine if the event is a loss of secondary coolant. This instrument is qualified for a dose of 2×10^6 rads which is less than the most severe radiation environment postulated for Area 2. However, these higher levels are for a large break LOCA, whereas this instrument is required only for a small break where the dose will be lower and the instrument would be expected to remain operable.

Radiation Monitoring System

R-1232
This component is utilized by the operator to determine radiation level inside containment. In the event of a LOCA, this component may not be operable to determine radiation levels. In connection with implementation of TMI related requirements new containment radiation monitors will be installed.

Instrument Air System

The instrument air system equipment is located in the southwest corner of the turbine building, Area 6. A steam or feedwater line break in Area 6 would be more towards the north end of this area and would be separated from the instrument air equipment, both by distance and by the massive steel structure which houses the auxiliary feedwater pumps. Therefore, it is unlikely that the instrument air system would see the temperature of 212°F which has been identified for Area 6. It is, therefore, expected that the instrument air equipment would remain operable in the event of a steam or feedwater line break in this area. However, in the event that the electric driven instrument air equipment is not operable there is a diesel driven air compressor which can be connected to the instrument air header.

Chemical and Volume Control System

CV-410, 411
These valves are on the sealwater return line to the volume control tank. In the event of a loss of coolant they are required to close to prevent loss of suction to the charging pumps and therefore, they receive a close signal from the Safety Injection Sequencer. The valves are located in the charging pump room of the reactor auxiliary building. Prior to initiation of recirculation this room is at ambient conditions and, therefore, the valves are qualified to close based on experience. The valves are not required to change position again and fail closed on loss of air, therefore, the prolonged effects of radiation are inconsequential.